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ABSTRACT

This paper suggests that clear understanding and articulation of explicit instructional objectives combined with the use of a simple table of specifications can significantly improve the quality of teacher-made tests. Topics addressed in these guidelines for the construction of tests by teachers include: instructional objectives, types of tests and associated characteristics, test content selection, and the development of tables of specifications. Bloom's Taxonomy, which classifies objectives into three major domains (cognitive, affective, and psychomotor), is used as a basis for the discussion. Criterion-referenced tests (including mastery tests) and norm-referenced tests are characterized. Hypothetical instructional objectives for a simple geometry test are outlined and placed within a table of specifications. (TJH)

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TEACHER-MADE TEST CONSTRUCTION

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TEACHER-MADE TEST CONSTRUCTION

The most important rule for the classroom teacher to remember in constructing test for classroom use is that the test should fit the objectives of the instruction. More precisely, the test should measure how well students have mastered the specific instructional objectives selected by the teacher. Clear understanding and enunciation of explicit instructional objectives combined with the use of a simple table of specifications can significantly improve the quality of teacher-made tests.

Objectives

There are several models for classifying instructional objectives. One of the more popular models is known as Bloom's Taxonomy which classifies objectives into three major domains -- cognitive, affective, and psychomotor. Each domain is further divided into different levels of complexity. For example, the cognitive domain is divided into six levels or caterories which form a hierarchy. In ascending order, the levels are knowledge, comprehension, application, analysis, synthesis, and evaluation.

The purpose here is not to elaborate upon how to write and/or classify objectives according to Bloom's Taxonomy. This model is mentioned here merely because it furnishes a useful guide for forming a table of specifications. Levels of the cognitive domain may be used as column headings within

the table. However, the decision on objectives and the format of the table is ultimately a choice to be made by the teacher. The right to decide what constitutes appropriate instructional objectives for her or his particular class remains with the instructor and the techniques discussed here should have flexibility sufficient for the teacher to adapt the techniques to his or her own objectives.

Types of Tests

Tests may be classified into two major categories: criterion-referenced (CRT) and norm-referenced (NRT). A third category -- mastery tests -- is a special type of criterion-referenced test. It is important that the teacher be aware of these types of tests and their charactersisics when deciding upon the purpose of the test and therefore the type of test to be constructed and administered. Test scores must be interpreted -- given meaning. One of the cheif distinguishing characteristics between CRT and NRT is the way the scores are interpreted.

Criterion-Referenced Tests

In CRT the score is interpreted by comparing the individual's score with some specified level or criterion of performance. There are some things which all students should know at the level of complete mastery such as the A B C's,

addition facts, multiplication facts, etc. A mastery test (CRT with restricted content) should be designed to measure such content. There is also certain subject matter content which is very stable and sequential, e.g., the student must be able to add before progressing to multiplication and division. Criterion-referenced tests are appropriate for measuring this type of progress.

The point is that there are certain subject matter topics for which the teacher decides that all students should demonstrate an acceptable level of proficiency whether the level is 100 percent mastery or some lower level. Tests of the CRT type are appropriate for measuring student progress toward such instructional objectives. Other uses of CRT are: (a) monitoring student progress in individualized instruction, (b) diagnosing specific difficulties among students, and (c) measuring the attainment of basic skills.

Norm-Referenced Tests

In NRT, the score is interpreted by comparing the individual's score with those of other individuals in the group. The group is called a norm group and may vary from a group of individuals in one particular classroom (usually the case for teacher-made tests), to a large group of individuals selected in a manner such that they form a representative nationwide sample of individuals who are similar in some respect such as age or grade placement.

Beyond those things which are essential knowledge, there are things which are nice to know. The dividing line between what is essential and what is nice to know may not be clear, but education beyond the essentials extends to the frontiers of knowledge. Naturally, most teachers are interested in their students learning more than the bare essentials. When instruction extends into this area, the teacher should change the focus of measurement or testing and try to measure the depts of the student's knowledge in the subject area. Thus the teacher should make test items more difficult in an effort to spread out scores so that students may be evaluated on the basis of their achievement in relation to others subjected to the same instruction. Table 1 shows a summary of the characteristics of CRT and NRT tests. This may aid the reader in better understanding when to use each of the two types of tests.

Table 1

CHARACTERISTICS	CRT	NRT
Purpose	To measure mastery of minimum essentials	To measure complete or wide range student achievement
Objectives	Explicit and specific	General (broad) and/or explicit
Learning outcomes covered	Limited range	Broad range
Number of items	Fewer items	Many items
Types of items	Objectively scored items	Objectively and subjectively scored items
Difficulty of items	Relatively easy but sufficient to measure proficiency	Items range from easy to difficult

Constructing a Test

Selecting the Content

Test items should be designed to measure explicit instructional (lesson) objectives. The instructional objectives should be compatible with the broader, course objectives. A list of the lesson objectives or an outline to the topics covered during instruction can function as a guideline for selecting content to be covered.

Table of Specifications

A table of specifications can be constructed quickly. For use by the classroom teacher, the table does not necessarily have to be real neat. One merely takes a sheet of paper and forms a column on the left of the sheet composed of a list of the topics or objectives to be measured. Across the top of the page one may list the type of test items to be used, or the type of tasks the students must perform, the level of performance according to Bloom's taxonomy, or any other arrangement which suits the test constructor's purpose. The following is a list of objectives and a table of specifications to exemplify the concept. The table of specifications cantains a double line of categories across the top to illustrate two different choices for organization.

Hypothetical Objectives

Course Objective: The students will be able to determine the area and perimeter of rectangles, squares, triangles, and parallelograms.

Comaptible and Explicit Instructional Objectives:

1. The student will be able to write correct definitions for a rectangle, square, triangle, and parallelogram.
2. When presented with pictures showing various sizes of rectangles, squares, triangles, and parallelograms, the student will correctly label each. The student will also recognize that squares and rectangles are also parallelograms.
3. When presented with dimensioned pictures of each, the student will be able to calculate the perimeter of a rectangle, square, triangle, and parallelogram.
4. When presented with dimensioned pictures of each, the student will be able to calculate the area of a rectangle, square, triangle, and parallelogram.
5. When presented with a written description and specific dimensions of a parallelogram, the student will be able to sketch the parallelogram, draw a diagonal, and calculate the area of the resultant triangles.

Table of Specifications

TEST Items / CONTENT AREAS	Knowledge		Comprehension		Application
	Definitions	recognition	Calculation of Perimeter	Calculation of Area	Solving Word Problems
Rectangle					
Square					
Triangle					
Parallelogram					
Totals					

Once a table of specifications is formed, the test constructior can then make a tally mark in the appropriate cell for each test item written. This allows one to keep

track of the number of test intem on each topic and the number in each category across the top. This lessens the probability that the test will be loaded on items dealing with the teachers "pet topic" or with items on topics for which test items are easy to construct. In addition, it makes it highly less probable that topics or objectives will be ignored on the test. In short, it makes for a better balanced test with a better sample of the content area to be measured which improves the validity and reliability of the instrument.

Teachers are very busy people. The normal reaction would be "the teacher does not have time to utilize a table of specifications". However, if the teacher is truly interested in constructing tests which are more valid and reliable, and intends to spend the time required to ensure that the test is well-balanced, then preparing a table of specifications may actually save time. Such a table provides an easy-to-follow outline, enabling the teacher to detect any topics omitted from the test as well as making sure that they are not including too many test items on their favorite topic. A little paractice and the result will be better tests.